"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

KICZALES, M.

Construction from cast or soldered parts? p. 8. TEHNICA NOUA. (Asociatia Stiintifica a Inginerilor si Tehnicienilor) Bucuresti. Vol. 3, No. 40, Mar. 1956.

So. East European Accessions List Vol. 5, No. 9 September, 1956

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

GOERTZ, Franciszek; KICZKA, Witold

Trials with application of vitamin B_{12} in prevention and therapy of the sequels of toxic diphteria; preliminary communication. Polski tygod.lek. 10 no.21:675-676 23 My '55.

1.(Z Kliniki Chorob Zakaznych Sl. Akad.Med. Wojewodzki Szpital Zakazny w Bytomiu; kierownik: zast.prof. dr Franciszek Goertz) Bytom, Wojw.Szpital Zakazny.

(DIPHTERIA
toxoid sequels prev. & ther., vitamin B_{12}.)
(VITAMIN B_{12}, ther. use
diphteria, toxoid, sequels)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

KICZKA, Witold; SZPECHT, Jozef

Case of septicemia during angina complicated by stomach rupture.
Polski tygod. lek. 14 no.6:258-260 9 Feb 59.

1. (Z Kliniki Chorob Zakaznych Slaskiej Akademii Medycznej w Bytomiu; kierownik kliniki: doc. dr med. K. Szymonski). Adres: Bytom, Kl. Chor. Zak. Sl. A.M.

(SEPTICEMIA AND BACTERIA, etiol. & pathogen.
septicemia caused by tonsillitis & perforated
peptic ulcer (Pol))

(PEPTIC ULCER, perf.
with septicemia caused by tonsillitis,
case report (Pol))

(TONSILLITIS, compl.
septicemia, with perf. of peptic ulcer
(Pol))

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

WALCZOK, Frantisek, MUDr.; KICZMER, Jan

New trends in popular resuscitation technique. Energetika Cz 12 no.4:206-207 Ap '62.

1. Krajsky ustav narodniho zdravi, Ostrava (for Walczok). 2. Elektrarny IX. sjezdu Komunisticke strany Ceskoslovenska, Karvina (for Kiczmer).

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

KIDAL, V.

Survey of foreign journals. Sel'khozmashina no.2:31-32 F '57.
(MLRA 10:4)

(Bibliography--Agricultural machinery)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

KIDAL, V.K.

Items from foreign journals. Trakt. i sel'khozmash. no.4:47 Ap '59.
(MIRA 12:5)

(Agricultural machinery)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

DZHAVAKHAYN, T.V., inzh.; KIDALINSKIY, L.P.; KHATSKELEVICH, M.N., inzh.; KLIMOV, N.N., inzh.

Reply to the inquiries of our readers. Elek. i tepl. tiaga 7 no.3:36-37 Mr '63. (MIRA 16:6)

1. Glavnyy inzh. Muromskogo zavoda im. F.E. Dzerzhinskogo (for Kidalinskiy).

(Electric railroads)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

TRESKOV, Yu.P., inzh.; KIDALINSKIY, V.L., inzh.

Trubotransformer with a high rated gear ratio. Vest. TSNII MPS 24 no.5:22-26 '65. (MIRA 18:9)

1. Vsesoyuznyy nauchno-issledovatel'skiy teplovoznyy institut.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

SMIRNOVA, M.N.; KIDALOV, I.V., student

Some new data on Karpinskii's "initial ridge" belt. Trudy GNI no.21:64-71 '59. (MIRA 14:5)
(Russian Platform --Geology, Structural)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

LOBODZINSKA, Maria; KIDANKIEWICZ, Tadeusz; SKURSKA, Zofia.

Selective hemagglutination of myxoviruses. Arch. immun. ther. exp. 12 no.2:164-172 '64

1. Department of Virology, Institute of Immunolog and Experimental Therapy, Polish Academy of Sciences, Wroclaw.

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

MAKOWER, Henryk; SKURSKA, Zofia; LOBODZINSKA, Maria; KIDANKIEWICZ, Tadeusz

Variability of Asian influenza virus cultured in chick embryo allantois. Posteny hig. med. dosw. 12 no.3:291-292 1958.

1. Instytut Immunologii i Terapii Doswiadczalnej PAN im. Ludwika Hirszfelda Dzial Wirusologii Wroclaw, ul. Chalubinskiego 4.
(INFLUENZA VIRUSES, culture,
Asian strains in chick embryo allantois, variability (Pol))

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

SKURSKA, Zofia; LOBODZINSKA, Marianna; KIDANKIEWICZ, Tadeusz; BALTOWSKA, Zofia; MAKOWER, Henryk.

Area irrigated with sewage. Its hygienic and sanitary evaluation. VII. Virological studies on sewage and rodents from fields irrigated with sewage water. Acta microbiol. pol. 10 no.4:457-468 '61.

1. Z Zakladu Wirusologii Instytutu Immunologii i Terapii Doswiadczalnej Polskiej Akademii Nauk we Wroclawiu.
(SEWAGE virol) (RODENTS virol) (VIRUSES)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

6

SURNAME, Given Names
KIDANKIEWICZ, T.

Country: Poland

Academic Degrees:

Affiliation:

Source: Warsaw, Postepy Higieny i Medycyny Doswiadczalnej, Vol XV, No 1
1961, pp 440-441.

Data: "Early and Late Influenza Virus Strains in Tissue Cultures of th
Chick Embryo." English abstract of article originally publishe
Arch. Immunol. i Terapii Dosw. 1960, 8, 101.

Authors:
SKURSKA, Z/ofia, PhD, Deputy Chief, Department of Virology (Zak
Wirologii), Ludwik Hirszfeld Institute of Immunology and Expe
mental Therapy (Instytut Immunologii i Terapii Doswiadczalnej
Ludwika Hirszfelda), Polish Academy of Sciences (PAN--Polska
mia Nauk), Wroclaw; Director: Prof. Stefan SLOPEK, Dr.
MAKOWER, H/enryk, MD., M Sc., Chief, Department of Virology, Lu
Hirszfeld Institute of Immunology and Experimental Therapy, P
Academy of Sciences, Wroclaw; Director: Prof. Stefan SLOPEK,
SYPULOWA, A.
LORODZINSKA, M.
KIDANKIEWICZ, T.

GPO 9

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

KIDANOVA, Z.S. (Moskva, D-182, N. Bodraya ulitsa, dom 11, kv.13)

Dynamics of the changes in the ballistocardiogram following surgery on the chest cavity in pulmonary tuberculosis.
Grud. khir. 6 no.1:109-111 Ja-F '64. (MIRA 18:11)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

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KOSITSKIY, G.I.; AGRACHEV, G.I.; VYSOKOVA, T.M.; KALANDADZE, Z.F.; KIDANOVA, Z.S.

Disorders of respiratory and circulatory function in chronic fibrous-cavernous pulmonary tuberculosis and their pathogenesis. Probl. tub. 38 no.3:75-83 '60. (MIRA 14:5)

1. Iz Nauchno-issledovatel'skogo instituta tuberkuleza Ministerstva zdravookhraneniya RSFSR (dir. V.F.Chernyshev, zamestitel' direktora po nauke - prof. D.D.Aseyev).
(TUBERCULOSIS) (RESPIRATORY ORGANS—DISEASES)
(BLOOD—CIRCULATION, DISORDERS OF)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

KIDANOVA, Z. S.

Ballistocardiographic observations of pulmonary tuberculosis.
Probl. tub. no.2:49-58 '62. (MIRA 15:2)

1. Iz elektrokardiograficheskogo kabineta (zav. - kandidat meditsinskikh nauk G. I. Agrachev) Moskovskogo nauchno-issledovatel'skogo instituta tuberkuleza Ministerstva zdravookhraneniya RSFSR (dir. - kandidat meditsinskikh nauk V. F. Chernyshev, zam. dir. po nauchnoy chasti - prof. D. D. Aseyev)

(TUBERCULOSIS) (BALLISTOCARDIOGRAPHY)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

AGRACHEV, G.I.; KIDANOVA, Z.S.

Dynamics of electrocardiographic charges following major chest surgery in tuberculosis. Probl.tub. no.6:79-86 '61. (MIRA 14:9)

1. Iz elektrokardiograficheskogo kabineta Moskovskogo nauchno-issledovatel'skogo instituta tuberkuleza Ministerstva zdravookhraneniya RSFSR dir. V.F. Chernyshev, zam.dir. po nauchnoy chasti - prof. D.D. Aseyev).
(TUBERCULOSIS) (LUNGS--SURGERY)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

ROZANOVA, M. D., doktor med. nauk; AGRACHEV, G. I., kand. med. nauk; VYSOKOVA, T. M., kand. med. nauk; KIDANOVA, Z. S.; MIRONOV, F. F.

Effect of exercise therapy on the functional state of adolescents with pulmonary tuberculosis. Probl. tub. 40 no.5:56-63 '62. (MIRA 15:7)

1. Iz Moskovskogo nauchno-issledovatel'skogo instituta tuberkuleza Ministerstva zdravookhraneniya RSFSR (dir. - kandidat meditsinskikh nauk V. F. Chernyshev, zam. dir. po nauchnoy chasti - prof. D. D. Aseyev).

(TUBERCULOSIS) (EXERCISE THERAPY)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

VYSOKOVA, T.M., kand.med.nauk; AGRACHEV, G.I., kand.med.nauk; KIDANOVA, Z.S.; SOLDATOV, V.Ye., kand.med.nauk

Functional state of respiratory organs and the cardiovascular system in patients with fibrocavernous pulmonary tuberculosis. Probl. tub. 42 no.3:13-18 '64. (MIRA 18:1)

1. Otdeleniye funktsional'noy diagnostiki i fizicheskikh metodov lecheniya (rukovoditel' S.R.Lachinyan) i 3-ye terapevticheskoye otdeleniye (rukovoditel' - prof. I.E.Sorkin) Moskovskogo nauchno-issledovatel'skogo instituta tuberkuleza (direktor - T.P.Mochalova; zamestitel' direktora po nauchnoy chasti - prof. D.D.Aseyev) Ministerstva zdravookhraneniya RSFSR.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

SPAFARIY, Nikolay Milesku (1636-1708); SOLOV'YEV, V.; KIDEL', A.; YUSTRA-
TOVA, N., red.; POLEVAYA, Ye., tekhn. red.

[Siberia and China] Sibir' i Kitai. Kishinev, Gos. izd-vo
"Kartia moldoveniaske," 1960. 514 p. (MIRA 14:10)
(Siberia—Description and travel)
(China—Description and travel)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

KIDEL', S.S.

[Present-day developments in lighting engineering abroad; survey of foreign technology] Sovremennoe sostoianie svetotekhniki za rubezhom; obzor zarubezhnoi tekhniki (OZT-89). Moskva, TSentr. in-t nauchno-tekhn. informatsii elektrotekhn. promyshl. i priborostroeniia, 1962. 59 p. (MIRA 17:9)

1. Moscow. Vsesoyuznyy institut nauchnoy i tekhnicheskoy informatsii.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

KIDER, F.

For further success of our gliders. p. 196. (Kridla Vlasti, No. 7, Apr 1957, Praha, Czechoslovakia)

SO: Monthly List of East European Accessions (EEAL) LC, Vol. 6, No. 8, Aug 1957. Uncl.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

L 39711-65 EWP(e)/EWA(c)/EWT(m)/EWP(b)/T/EWA(d)/EWP(t) IJP(c) JD/JG

ACCESSION NR: AP5006329 S/0126/65/019/002/0241/0250

23
22
B

AUTHOR: Kidin, I. I.; Shtremel', M. A.; Lisunov, V. I.

TITLE: Structural transformation of carbon-free austenite with 8% chromium

SOURCE: Fizika metallov i metallovedeniye, v. 19, no. 2, 1965, 241-250

TOPIC TAGS: austenite, chromium alloy, dislocation density, phase transformation

ABSTRACT: When a tempered iron alloy containing 8% Cr and 0.2% C is heated at the rate of 2500-10000°/sec, the austenite grain is broken up after completion of the $\alpha\to\gamma$ transformation. This phenomenon is studied in an attempt to determine whether the grain reduction is due to "process recrystallization" (i.e., whether it is caused by a reduction in dislocation density), and whether phase hardening takes place during the $\alpha\to\gamma$ transformation. The isothermal process of grain reduction after austempering at the rate of 5000°/sec is also studied. It is found that an extremely slight disorientation of the austenite needles is enough to cause process recrystallization. The question of phase hardening as a possible source of dislocations needs further study.

Card 1/2

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

L 39714-65

ACCESSION NR: AP5006829

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steel and Alloys)

SUBMITTED: 31Jan64 ENCL: 00 SUB CODE: MM

NO REF SOV: 011 OTHER: 008

Card 2/2

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

KIDIN, I. N., Engr. Cand. Tech. Sci.

Dissertation: "Effect of High-Frequency Hardening on the Mechanical Properties and Structure of Steel." Moscow Order of the Labor Red Banner Inst of Steel imeni I. V. Stalin, 29 May 47.

SO: Vechernyaya Moskva, May, 1947 (Project #17836)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

IA 1/49T70

KIDIN, I. N.

Jun 48

USSR/Metals
Steel, Carbon
Tempering

"Effect of High Frequency Tempering on the Structure and Strength of Carbon Steel," I. N. Kidin, Cand Tech Sci, Moscow Steel Inst, 5 pp

"Stal'" No 6

Great effects of high frequency tempering of carbon steel can be achieved only after close determination of structure and high degree of hardness of steel. Important factors in high frequency tempering are tempering temperature and speed with which various parts are heated by high frequency currents.

1/49T70

[redacted]

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

KIDIN, I. N.

PA 37/49T98

USSR/Metals
Tool Steel, Tempering

Jun 48

"Fundamental Parameters for High-Grade Tempering of Tool Steel," I. N. Kidin, Cand Tech Sci, Moscow Steel Inst imeni I. V. Stalin, $3\frac{1}{2}$ pp

"Stanki i Instrument" No 6

Treats under: method of determining speed of high-frequency tempering, conditions of experiment, effect of tempering temperature on structure and hardness of steel, effect of speed of tempering on structure and hardness of steel, and conclusions.

[redacted]

37/49T98

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

9 10

TRANSFORMATION DURING HEATING WITH HIGH-FREQUENCY CURRENTS. I. N. Kidin. (Journal of Technical Physics, U.S.S.R., 1946, Vol. 16, Jan., pp. 75-84) (In Russian) (Abstract) Metals Review, 1948, vol. 21, July, p. 34).

An account is given of phase transofrmations of steel during thermoelectric treatment. It was found that the characteristic feature of the transformation was the specific action of the current on the ferrocementite mixture and consolidation of the lines of force at the phase boundary, resulting in quicker formation of austenite nuclei than in other methods of heat treatment.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

PROCESSES AND PROPERTIES INDEX

8

Basic Conditions for High-Frequency Hardenink of Toolsteel. (In Russian.) I. N. Kidin. *Stanki i Instrumenti* (Tools and Instruments), v. 19, June 1948, p. 10 13.

Gives results of investigation of factors to be considered in the above, particularly influence of temperature and rate of heating. Optimum conditions for different toolsteels are shown graphically.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

K[illegible]DI[illegible], [illegible]. [illegible].

Kilin, [illegible]. [illegible]. - "The properties of structural steel tempered [illegible] with high-frequency current", Sbornik (Mosk. in-t stali im Stalina), 27, 1949, p. 34-50, - Bibliog: 7 items.

SO: U-3[illegible], 11 March 53, (Letopis 'Zhurnal 'nykh Statey, No. [illegible], 1949).

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

KIDIN, J. N.

Induction Hardening (Termitcheskaia Obrabotka Stali pri Inductsionnom Nagreve), 316 pp, Government Scientific- Technical Publishing House of Ferrous and Non-Ferrous Metallurgy, Moscow, 1950.

Book, B-68125, 1 Sep 53

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

B

B

Annealing of Alloy Tool Steel After High-Frequency Tempering. (In Russian.) I. N. Kidik. *Stanki i Instrument* (Machine Tools and Equipment), v. 21, May 1950, p. 22-23.

Influence of conditions of annealing on hardness and impact strength of above steels was investigated. Such influence was found to be dependent upon structural changes within the steel brought about by the tempering treatment. Data are tabulated and charted.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

Heat Treatment & Furnaces

S

Tempering Alloy Tool Steel after High-Frequency Hardening. I. N. Kidik. (*Stanki i Instrument*, 1950, No. 5, 22–23). [In Russian]. In the experimental work described, the effect of tempering conditions on the hardness and impact strength of specimens of two chromium tool steels, previously subjected to high-frequency hardening, was studied. The use of higher rates of heating in this hardening method resulted in higher specific impact energy but somewhat lower hardness at all temperatures of tempering. A. K.

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

KIDIN, I. N.

Metals - Heat Treatment

Induction tempering. Nauka i zhizn' 19 No. 6 (1952)

Monthly List of Russian Accessions, Library of Congress, September 1952. UNCLASSIFIED.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

KIDIN, I.N.

Phase transformations in steel during high-frequency hardening.
[Izdaniia] LONITOMASH no.30:221-229 '52. (MLRA 8:1)
(Steel--Hardening)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

KOGAN, I. N.

18 4E3c

Effect of the initial structure upon the properties of steel after high-frequency hardening. I. N. Kogan. [illegible] (Russian) [illegible] *Stal* 31, 19[illegible]. — High-frequency hardening produces uniformity of fine structure. The effect of initial grain structure upon the properties of hardened steel depends on its fineness. The grain size was measured on a scale from no. 1 to no. 8 in the order of decreasing size. The initial fineness of grains must be from no. 5 to no. 8, and the rate of inductive heating 100°/sec. in order to obtain fine-grain martensite in steel contg. 0.70% C. Graphs and photomicrographs are given. Alexis N. Pestoff

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

KIDIN, I. N.

[illegible]

329/11) 669.14-15

Temperature Conditions of Phase Transformations in High Frequency Heated Steel

Zh.Tekh.Fiz. 24(11), 201[illegible]-2024 1954 U.S.S.R.

I.N. Kidin, M.G. Kogan

The characteristic features are discussed of high frequency heating of steel which are due mainly to the reduction of the absorbed capacity owing to the loss of ferro-magnetic properties by the surface layer, and to the reduction of the volume of the magnetic phase during the pearlite-austenite transformations. The latter, however, did not seem to affect to any considerable extent the kinetics of the rapid HF heating. The phenomena observed are related to the analytical theory of heat conductivity. (Bibl. 16)

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

KIDIN, Ivan Nikolayevich

(Moscow Order of Labor Red Banner Inst of Steel imeni Stalin) - Academic degree of Doctor of Technical Sciences, based on his defense, 19 June 1955, in the Council of the Inst of Metallurgy imeni Baykov of the Acad Sci USSR, of his dissertation entitled: "Phase Transformations in Steel When Heated by Induction," and the academic title of Professor - Chair: "Heat Treatment."

Academic degree and/or title: Doctor of Sciences and Professor

SO: Decisions of VAK, List no. 1, 7 Jan 56, Byulleten' MVO SSSR, Uncl.
JPRS/NY-548

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

KIDIN, I. N.; KRYUKOV, S. N.; ZAKMAROV, E. K.;

"The Examination of the Heterogeneity of Steel by its Carbon Distribution After High-Frequency Hardening," in book The Application of Radioisotopes in Metallurgy, Symposium XXXIV; Moscow; State Publishing House for Literature on Ferrous and Nonferrous Metallurgy, 1955.

I. N. KIDIN, Chair of Metallography and Heat Treatment, Chair of Physical Chemistry, Moscow Inst. of Steel im I. V. Stalin; KRYUKOV, S. N. (Ass't); ZAKMAROV, E. K. (Engr. Chair of Metallography and Heat Treatment.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

Kidin, I. N.

USSR / Phase Conversions in Solids. E-5

Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 9285

Author : Kidin, I.N.
Title : Certain Features of the Kinetics of Surface Induction Heating of Steel.

Orig Pub : Sb. Mosk. in-ta Stali, 1955, 33, 12-68

Abstract : A detailed analytic and experimental investigation of the kinetics of the induction heating, considered in connection with the features of the non-stationary process of heat conduction, alternating with the establishment of quasi-stationary states. Particular attention is paid to the deformation of the temperature curve of heating, connected with the transition of the heated material from the ferromagnetic into the paramagnetic state in the phase transformation.

Card : 1/1 Chair of Metallography & Heat Treatment

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KIDIN, I. N

Category : USSR/Solid State Physics - Phase transformation of solid bodies E-5

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 1178

Author : Kidin, I.N.

Title : Basic Stages in the Kinetics of the Formation of Austenite in Induction Heating

Orig Pub : Sb. Mosk. in-ta stali, 1955, 33, 69-74

Abstract : Three basic types of kinetics of induction heating of steel are established. In the first case the metal temperature vs. time curves comprise an initial steep straight-line section, a section with variable curvature, and a third less-steep straight-line section. In the second case, the curve consists of a sloping straight line, a straight-line section parallel to the time axis, and again of a sloping straight line. The third type of curve consists of two inclined straight lines. This behavior of the induction-heating curve is due to the redistribution of the heat power delivered during the magnetic transformations, and not by the presence of phase transformations or by the nature of their development.

Card : 1/1

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ZHUKHOVITSKIY, A.A., professor, doktor khimicheskikh nauk; KIDIN, I.N., kandidat tekhnicheskikh nauk, dotsent; THUBIN, K.G., professor, doktor.

Preface. Sbor.Inst.stali 34:5-6 '55. (MIRA 9:7)
(Physical metallurgy) (Radioactive tracers--Industrial applications)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

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Kidin, I. N.

AE2c

3

Investigation of homogenization after concentration of steel after high-frequency hardening. I. N. Kidin, S. N. [illegible] (Moscow [illegible]) [illegible] 1958, No. [illegible]; Referat. Zhur. Met. 1959, No. 1000.—C[14] was introduced in the solid state into steel 20 (0.24% C) by heating it at 950° with C[14]-enriched BaCO3. Samples were then heated by high-frequency current at 30°/sec. to 750–1000° and quenched in water. Microautoradiographs taken from samples were used to construct histometric curves of C distribution. It was concluded that sufficiently complete leveling of C content was achieved only at 1100°, when C concentration in the middle of former ferrite grains reaches [illegible] of average content.

Y. N. [illegible]

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

AL'TGAUZEN, O.N., kandidat fiziko-matematicheskikh nauk; BERNSHTEYN, M.L., kandidat tekhnicheskikh nauk; BLANTER, M.Ye., doktor tekhnicheskikh nauk; BOKSHTEYN, S.Z., doktor tekhnicheskikh nauk; BOLKHOVITINOVA, Ye.N., kandidat tekhnicheskikh nauk; BORZDYKA, A.M., doktor tekhnicheskikh nauk; BUNIN, K.P., doktor tekhnicheskikh nauk; VINOGRAD, M.I., kandidat tekhnicheskikh nauk; VOLOVIK, B.Ye., doktor tekhnicheskikh nauk [deceased]; GAMOV, M.I., inzhener; GELLER, Yu.A., doktor tekhnicheskikh nauk; GORELIK, S.S., kandidat tekhnicheskikh nauk; GOL'DENBERG, A.A., kandidat tekhnicheskikh nauk; GOTLIB, L.I., kandidat tekhnicheskikh nauk; GRIGOROVICH, V.K., kandidat tekhnicheskikh nauk; GULYAYEV, B.B., doktor tekhnicheskikh nauk; DOVGALEVSKIY, Ya.M, kandidat tekhnicheskikh nauk; DUDOVTSEV, P.A., kandidat tekhnicheskikh nauk; KIDIN, I.N., doktor tekhnicheskikh nauk; KIPNIS, S.Kh., inzhener; KORITSKIY, V.G., kandidat tekhnicheskikh nauk; LANDA, A.F., doktor tekhnicheskikh nauk; LEYKIN, I.M., kandidat tekhnicheskikh nauk; LIVSHITS, L.S., kandidat tekhnicheskikh nauk; L'VOV, M.A., kandidat tekhnicheskikh nauk; MALYSHEV,K.A., kandidat tekhnicheskikh nauk; MEYERSON, G.A., doktor tekhnicheskikh nauk; MINKEVICH, A.N., kandidat tekhnicheskikh nauk; MOROZ, L.S., doktor tekhnicheskikh nauk; NATANSON, A.K., kandidat tekhnicheskikh nauk; NAKHIMOV, A.M., inzhener; NAKHIMOV, D.M., kandidat tekhnicheskikh nauk; POGODIN-ALEKSEYEV, G.I., doktor tekhnicheskikh nauk; POPOVA, N.M., kandidat tekhnicheskikh nauk; POPOV, A.A., kandidat tekhnicheskikh nauk; RAKHSHTADT, A.G., kandidat tekhnicheskikh nauk; ROGEL'BERG, I.L., kandidat tekhnicheskikh nauk;

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AL'TGAUZEN, O.N.---- (continued) Card 2.
SADOVSKIY, V.D., doktor tekhnicheskikh nauk; SALTYKOV, S.A., inzhener; SOBOLEV, N.D., kandidat tekhnicheskikh nauk; SOLODIKHIN, A.G., kandidat tekhnicheskikh nauk; UMANSKIY, Ya.S., kandidat tekhnicheskikh nauk; UTEVSKIY, L.M., kandidat tekhnicheskikh nauk; FRIDMAN, Ya.B., doktor tekhnicheskikh nauk; KHIMYSHIN, F.F., kandidat tekhnicheskikh nauk; KHRUSHCHEV, M.M., doktor tekhnicheskikh nauk; CHERNASHKIN, V.G., kandidat tekhnicheskikh nauk; SHAPIRO, M.M., inzhener; SHKOL'NIK, L.M., kandidat tekhnicheskikh nauk; SHRAYBER, D.S., kandidat tekhnicheskikh nauk; SHCHAPOV, N.P., doktor tekhnicheskikh nauk; GUDTSOV , N.T., akademik, redaktor; GORODIN, A.M. redaktor izdatel'stva; VAYNSHTEYN, Ye.B., tekhnicheskiy redaktor

[Physical metallurgy and the heat treatment of steel and iron; a reference book] Metallovedenie i termicheskaia obrabotka stali i chuguna; spravochnik. Pod red. N.T.Dudtsova, M.L.Bernshteina, A.G. Rakhshtadta. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1956. 1204 p. (MLRA 9:9)

1. Chlen -korrespondent Akademii nauk USSR (for Bunin)
(Steel--Heat treatment) (Iron--Heat treatment)
(Physical metallurgy)

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

KIDIN, I.N., doktor tekhnicheskikh nauk, professor.

Correlation between induction heating parameters and the grain size of austenite in carbon steel. Metalloved. i obr.met. no.1: 40-41 Ja '56. (MLRA 9:6)

1.Moskovskiy institut stali imeni Stalina.
(Steel--Metallography) (Austenite)

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KIDIN, I.N.

Forbidden regions of induction [illegible] in the hardening of steel. I. N. Kidin [illegible]. Metalloved. i Obrabotka Metallov 1956, No. [illegible] induction heating of steel U8 [illegible] a 250,000-cycle generator. The surface temp. [illegible] just above the Curie temp. of the ferrite and decreased to [illegible] again beginning to increase. This decrease was caused by the change in magnetism of the ferrite. Assume that [illegible] during the interval between [illegible] had a composition quite different from the [illegible] of the steel, and the [illegible] of reliable quality [illegible] produced [illegible] curves of the [illegible] steel [illegible] heated at 1000°/sec. [illegible] similarly heated but held in the [illegible]. The [illegible] was uniform. For a 0.4% C steel the [illegible] is increased with heating [illegible] at 200°/sec. The temp. [illegible] at about 700°/sec. and [illegible] at 3000°/sec. A. G. Guy

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KIDIN, I.N.

Category : USSR/Solid State Physics - Phase Transformation in Solid Bodies E-5

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3826

Author : Kidin, I.N.
Inst : Moscow Institute of Steel, USSR
Title : Mechanism of Formation of Austenite in Rapid Heating

Orig Pub : Dokl. AN SSSR, 1956, 106, No 6, 1019-1022

Abstract : A new mechanism is proposed for the formation and growth of austenite nuclei. The author proposes that the amount of carbon on the boundaries of the blocks of the mosaic structure of α-iron exceeds its solubility in the α-iron. Experiments have shown, that this supersaturation may reach 0.25% and in this case the phase transformation occurs upon rapid heating at 820°. In the case of diffusion migration of the austenite-ferrite boundary, there is formed in addition to the diffusion boundary also a boundary complex of minute nuclei. The development of this process leads to the formation of a very finely ground austenite. One should observe simultaneously an increase in the microhardness of the center of the ferrite grain. Experimental measurements were made of the microhardness

Card : 1/2

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Category : USSR/Solid State Physics - Phase Transformation in Solid Bodies E-5

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3826

of the grains and the contact electric heating of technically pure iron was investigated with simultaneous oscillographic recording of the thermal and dilatometric curve. Dilatrometric investigations were carried out with Panov's capacitive dilatometer. The measurement results confirmed the predicted theoretical hypotheses.

Card : 2/2

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KIDIN, I. N.

"Austenite Formation During Heat Treatment,"

paper presented at the Metallurgical Congress in Chicago, 6 November 1957.

Moscow Steel Inst.

Eval. and Abst. B-3,095,520

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KIDIN, IVAN NIKOLAYEVICH

~~KIDIN, Ivan Nikolayevich~~; LOZINSKIY, M.G., redaktor; ROZENTSVEYG, Ya.D., redaktor izdatel'stva; MIKHAYLOVA, V.V., tekhnicheskiy redaktor

[Phase conversions during accelerated annealing of steel] Fazovy prevrashcheniia pri uskorennom nagreve stali. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1957. 92 p.
(Steel--Heat treatment) (MIRA 10:9)

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

SOV/137-59-1-1823

Translation from: Referativnyy zhurnal Metallurgiya, 1959, Nr 1, p 241 (USSR)

AUTHORS: Kidin, I. N., Bashnin, Yu. A.

TITLE: Certain Specific Technological Properties of High-frequency Hardening Associated With the Kinetics of Induction Heating (Nekotoryye tekhnologicheskiye osobennosti vysokochastotnoy zakalki, svyazannyye s kinetikoy induktsionnogo nagreva)

PERIODICAL: V sb : Prom primeneniye tokov vysokoy chastoty. Riga, 1957, pp 123-133

ABSTRACT: A report on the general aspects of the kinetics of induction heating (IH) and practical recommendations on procedures for high-frequency hardening (HH) are given. Upon attaining t_c during IH an inflection point appears on the heating curve which is caused by the decrease and redistribution of the specific power. The basic types of IH kinetics are: Curves with a dip (saddle), a flat top, or an inflection. The phase transformations (PT) proceed in three stages: Nonisothermal in the $A_1 \rightarrow t_c$ range, isothermal at t_c, and nonisothermal at $> t_c$. In the case of an inflection the isothermal stage is absent. The effect of alloying of steel with Cr, W, and Ni on the

Card 1/2

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Certain Specific Technological Properties of High-frequency Hardening (cont.) SOV/137-59-1-1823

results of HH is examined. The hypothesis on the displacement of PT into the area of more elevated temperatures during IH and the necessity of using higher temperatures during HH than during the usual heating procedure is confirmed. A new thermal parameter of the rate of IH in the PT range (above the inflection point on the curve) is proposed. For a group of steels with 1% Cr and 0.42 - 1.01% C diagrams are adduced of the prevailing and permissible IH specifications in the coordinates HH temperature vs. IH rate in the PT region. With an increase in the concentration of C there is an expansion of the temperature range of HH which causes increased hardness. An increase in the IH rate widens the zone of prevailing heating. IH is impractical with an IH rate < 50°C/sec. The largest zone of predominant HH performance is observed with IH rates of 200°C/sec.

L. F.

Card 2/2

Kidin, I. N.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6"

PHASE I BOOK EXPLOITATION 275

AUTHOR: See table of contents

TITLE: Working of Steel and Alloys (Obrabotka stali i splavov)

PUB. DATA: Gosudarstvennoye nauchno-tekhnicheskoye izdatel'stvo literatury po chernoy i tsvetnoy metallurgii, Moscow 1957, 451 pp., 3,000 copies

ORIG. AGENCY: Moskovskiy ordena trudovogo krasnogo znameni institut stali imeni I. V. Stalina

EDITORS: Responsible Ed.: Kidin, I. N.; Ed. of Publishing House: Dokukina, Ye. V.; Tech. Ed.: Attopovich, M. K. Editorial Council of the Moscow Steel Institute (Institute stali): Glinkov, M. A., Professor, Doctor; Grigorash, R. N., docent, candidate of tech. sciences; Gudtsov, N. T., Academician (deceased); Yelyutin, V. P., professor, doctor; Zhukhovitskiy, A. A., professor, doctor; Kidin, I. N., professor, doctor; Livshits, B.G., professor, doctor; Lyubimov, A. P., professor, doctor; Pavlov, I. M., corresponding number of the Academy of

Card 1/15

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

It is shown that the microstructural hardness and durability of titanium-tungsten alloys increases with the amount of tungsten in the alloy. There are 2 Soviet references, 1 in English.

The author investigates the effects of structure and chemical composition of the active crystal nucleus in eutectoid changes of steel alloys. The carbide phase in the eutectoid change and in tempering was chosen as a specific example. There are 2 Soviet references, 2 English, 1 Scandinavian.

Card 3/15

Practical experiments carried out by the author with various

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theory of kinetics in this kind of heating. There are 27 Soviet references.

The author arrives at the following conclusions: 1. the hardening temperature of chrome steel should be higher than that of tungsten and molybdenum steels, and 2. the different nature of the kinetics of heating of chrome and nickel steels indicate that with the increase of Cr content the size of the austenite grains decrease and will increase in size with the amount of Ni. There are 3 Soviet references.

This paper deals with the effect of induction heating parameters on the size of austenite grains of molybdenum steels and on the hardness of this steel after hardening. The conclusion
Card 4/15

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

SOV/137-58-11-23456

Translation from: Referativnyy zhurnal. Metallurgiya, 1958, Nr 11, p 231 (USSR)

AUTHORS: Kidin, I. N., Astaf'yeva, Ye. V.

TITLE: A Radiographic Investigation of Nonuniformity of Martensite Produced During Hardening of Steel With Induction Heating (Issledovaniye neodnorodnosti martensita, poluchennogo pri zakalke stali s induktsionnym nagrevom, metodom radiografii)

PERIODICAL: V sb.: Prom. primeneniye tokov vysokoy chastoty. Riga, 1957, pp 194-205

ABSTRACT: Autoradiography methods were employed in an investigation of the distribution of C in the structure of induction-hardened steel St 20. The C^{14} isotope was introduced into the specimens by means of annealing them in vacuum, at a temperature of 1100°C for a period of four hours, together with $BaCO_3$ enriched with C^{14}. After annealing, the average size of a pearlitic region amounted to approximately 65μ and that of a ferritic field to 115μ. Heating rates (HR) of 30, 130, and 230 degrees/second were employed in the region of phase transformations. At all HR the quenching was performed at temperatures ranging from 800 to 1300°. Photometric evaluation of the radiograms

Card 1/2

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SOV/137-58-11-23456

A Radiographic Investigation of Nonuniformity of Martensite Produced During (cont.)

revealed that the nonuniformity of C distribution at all quenching temperatures increases with increasing HR. A fully hardened structure may be obtained only at a temperature of 1100° or above. During quenching from a temperature of 900° the concentration of C in the central portions of the formerly pearlitic regions amounts to 0.57% at an HR of 30°/sec and 0.75% at an HR of 130°/sec. Almost complete equalization of the C concentration was attained only after quenching from a temperature of 1300° at a minimal HR of 30°/sec; at an HR of 230°/sec, the C concentration in the central portions of the formerly pearlitic regions amounted to 0.58% and in the ferritic interstices to 0.07% only. Regardless of the HR the intensity of diffusion processes is greater at 800-1100° than it is at 1100-1300° owing to a reduction in the gradient of C concentration at temperatures ranging from 1100 to 1300°.

L.F.

Card 2/2

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

129-2-3/10

AUTHOR: Kidin, I.N., Dr. of Technical Sciences Prof. (Moscow)

TITLE: The Kinetics of Dissolution of Carbides in Tungsten Steel During Induction Heating. (Kinetika rastvoreniya karbidov vol'framovoy stali pri induktsionnom nagreve.)

PERIODICAL: Metallovedeniye i obradotka metallov, 1957, No. 2, pp. 18-23 (U.S.S.R.)

ABSTRACT: The author investigated processes occurring in tungsten steels and particularly the dissolution of carbides in such steels during high frequency induction heating. The experiments were carried out on alloys containing 1.5 and 10% W and about 0.6 and 1% C; the exact composition of the six tested materials and their Ac_1 and Ac_3 points are given in Table 1, p. 19. Prior to high frequency hardening a carbide deposit was separated electrolytically, and after washing and drying was subjected to X-ray analysis using iron radiation. The precipitation was induced with a current density of A/cm^2 for fifteen minutes and during this time an 0.5 to 0.7 mm layer dissolved from the surfact. It was found that the temperature of intensive dissolution

Card 1/4

129-2-3/10

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TITLE: The Kinetics of Dissolution of Carbides in Tungsten Steel During Induction Heating. (Kinetika rastvoreniya karbidov vol'framovoy stali pri induktsionnom nagreve.)

of carbide Fe_3W_3C during induction heating is lower than during ordinary heating. In steel containing 0.6% C the tungsten carbide dissolved fully or almost fully at 880°C, if the heating rate was 40°C/sec. By raising the heating rate to 75 C/sec the dissolution of the carbides in the steel containing 1% W is mainly completed at 960°C and in the steel containing 5% W at 1040°C. In the case of a high heating rate (200°C/sec.) an increase in the temperature will be more effective the lower the W content of the steel with 1% C. In steel containing 10% W the dimensions of the particles decrease by 18% at 980 - 1040°C and the corresponding figures are 40% for 5% W and 49% for steel with 1% W as compared to the initial state. With an increasing heating rate the temperature of complete dissolution of the carbides in tungsten steel increases. Stabilisation of the temperature of dissolution of iron-tungsten carbides with increasing heating rate was not observed during the tests. In specimens containing

Card 2/4

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129-2-3/10

TITLE: The Kinetics of Dissolution of Carbides in Tungsten Steel during Induction Heating. (Kinetika rastvoreniya karbidov vol'framovoy stali pri induktsionnom nagreve.)

reduction of the carbide particles can be observed with increasing hardening temperature and decreasing rate of heating to an equal temperature. Table 2 gives data on statistical investigations which shows the chemical composition, the heating temperature, the average partical diameter at various heating speeds and the number of particles per mm^2 at various heating speeds.

The text includes 2 tables and 3 sets of photographs. There are no references.

ASSOCIATION: Moscow Steel Institute (Moskovskiy Institut Stali)

PRESENTED BY: ---

SUBMITTED: ---

AVAILABLE: Library of Congress

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

AUTHOR: Kidin, I.N. (Moscow). 24-4-9/34

TITLE: Investigation of the fine structure of chromium iron tempered after hardening from a high temperature at a high speed. (Issledovaniye tonkoy struktury khromistogo zheleza, otpushchennogo posle zakalki pri nagreve s bol'shoy skorost'yu).

PERIODICAL: "Izv. Ak. Nauk, Otd. Tekh. Nauk" (Bulletin of the Ac. Sc., Technical Sciences Section), 1957, No.4, pp.63-69 (USSR).

ABSTRACT: In earlier published work (8) and (9) the author established that the fine structure of alloyed iron can change not only as a result of volume changes due to phase hardening during cooling but also as a result of formation of the γ-phase during heating of the alloy. These data provide additional experimental confirmation of the hypothesis on the formation of austenite nuclei along the boundaries of coherent regions which increase considerably in quantity and decrease in size owing to the inhibited growth at very high heating rates. To elucidate the differences between the changes in the fine structure and the softening occurring in the case of hardening with high heating rates from those occurring during current type hardening, the authors investigated the fine structure during tempering of iron containing 5.2% Cr after hardening following slow heating and after high frequency hardening with heating rates of 50 and 1000 C/sec during

Card 1/3

Investigation of the fine structure of chromium iron tempered after hardening from a high temperature at a high speed. (Cont.) 24-4-9/34

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the second stage. The melt was produced from Armco iron and metallic chromium in a 10 kg induction furnace. After homogenisation annealing, rods of 18 mm dia. were produced by forging; the shaping and dimensions of the specimens were described in an earlier paper (9). The decrease in size of the coherent regions and the increase of Type II stresses during the hardening are determined by three factors: phase hardening caused by volume changes during γ to α-transformation, the intensity of these volume changes which depends on the cooling rate during hardening and the character of the fine structure of the γ-phase which is determined by the inter-relation between the temperature and the heating speed. Comparison of the influence of the fine structure of the austenite and the intensity of γ to α-transformations indicates that the second of these factors is less important. The more metastable the structure which forms after hardening the lower will be the tempering temperature at which an appreciable growth of the coherent zones and a reduction of the Type II stresses begins. The temperature at which a decrease of Type II stresses begins is 200 to 150 C lower than the temperature at which an increase in the dimensions of the

Card 2/3

Investigation of the fine structure of chromium iron tempered after hardening from a high temperature at a

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

AUTHOR: Kidin, I.N., Doctor of Technical Sciences, Prof. 129-9-9/14

TITLE: Influence of the parameters of induction heating on the size of the austenitic grain in nickel steel. (Vliyaniye parametrov induktsionnogo nagreva na velichinu zeren austenita nikelevoy stali).

PERIODICAL: "Metallovedeniye i Obrabotka Metallov" (Metallurgy and Metal Treatment), 1957, No.9, pp.36-42 (U.S.S.R.)

ABSTRACT: The conditions of formation of austenite and of its kinetic characteristics during induction heating depends to a certain extent on the mutual position of three temperatures, namely, the beginning of formation of austenite, A_1, the Curie point and the temperature of heating during hardening; the first two temperatures are determined by the composition of the steel, the third is chosen not only as a function of the composition of the steel but also as a function of the speed and shape of the induction hardening curve. It is shown that in more highly alloyed steels the influence of the first (pre-isothermal) and second (isothermal) stages of induction heating is smaller than in less alloyed steels; the third stage of heating, that following the isothermal stage, is of greatest importance, the temperature range of this stage decreases

Card 1/4

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

Influence of the parameters of induction heating on the size of the austenitic grains in nickel steel. (Cont.)
129-9-9/14

with increasing chromium content and increases with increasing nickel content. In this paper the results are described of experimental investigations of nickel steels obtained from about twenty melts, the compositions of which are given in Table 1, p.38. The steel was smelted in a 10 kg capacity induction furnace and, after forging of the ingots into rods and annealing, specimens were produced, the shape of which is shown in Fig.4, p.38. After hardening, the specimens were subjected to a special etching process which permits clear observation of the grain boundaries and, following that, the specimens were viewed by microscope and the grain dimensions determined according to the histogram method. The microphotos, Fig.5, show the change in the grain size of austenite in a steel containing 0.6% C and 1% Ni as a result of increasing the heating temperature at a constant heating rate. The graphs, Fig.6, show the influence of the induction heating parameters on the hardness and grain size of the austenite of nickel steel containing 0.99 to 9.52% Ni. The graphs, Fig.7, show the influence of the temperature, the speed of the induction heating and the nickel content on the austenite grain size in nickel steel containing 0.2, 0.6 and 1% C. Table 2

Card 2/4

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Influence of the parameters of induction heating on the size of the austenitic grains in nickel steel. (Cont.)
129-9-9/14

gives the average grain size of the austenite for steels containing 1, 2.5, 5 and 10% Ni and 0.2, 0.4, 0.6, 0.8 and 1% C for hardening temperatures of 800, 880, 960 and 1040 $^{\circ}$C and heating rates of 40, 50, 75, 130 and 200°C/sec. In all the studied cases the influence of the induction heating parameters on the austenite grain size remained the same; if the heating rate remains unchanged the grain size will increase with increasing temperature. For an equal final heating temperature the grain dimensions of the austenite will decrease with increasing heating speed. Under equal induction heating conditions the austenite grains of nickel steel will grow faster than those of chromium steels of similar composition. One of the main reasons for this is the difference in the position of the critical point A_1; owing to lowering of this value by the nickel the transformation temperature range for an equal heating temperature is considerably wider than for chromium steel. Of great importance also is the absence in nickel steel of carbides with difficult solubility, whilst chromium steels do contain such carbides. The three-dimensional diagrams of Fig.7, in which the dependence of the austenite grain

Card 3/4

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

Kidin, I.N.

AUTHORS: Kidin, I. N., and Panov, A. V.

TITLE: Use of the Capacity Dilatometer for Research of Phase Conversion during Rapid Heating (Primeneniye emkostnogo dilatometra dlya issledovaniya fazovykh prevrashcheniy pri bystrom nagreve)

PERIODICAL: Zavodskaya Laboratoriya, 1957, Vol. 23, No. 1, pp. 48-52 (U.S.S.R.)

ABSTRACT: The authors find that joint thermic and dilatometric analysis generally cannot be used because of the considerable lack of correspondence between the degree of inertness of existing dilatometers and the rapid speed of heating. The oscillograph is therefore preferred for recording the temperature curve. In order to record the temperature curve, the authors assembled a special device which enabled them to record changes in the line of heating with a speed of 1 to 10,000 deg/sec. The equipment by which this is done is explained with drawings and graphs: stand for holding the specimen, circuit of the generating unit, circuit of the amplifier for the dilatometer, circuit of the amplifier of the DC to the dilatometer. Thermic and dilatometric curves for technically pure iron with .02% C and .07% C.

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

Kidin I. N.

137-58-3-5845

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 3, p 196 (USSR)

AUTHOR: Kidin, I. N.

TITLE: Kinetics of Induction Heating of Alloyed Steel (Kinetika induktsionnogo nagreva legirovannoy stali)

PERIODICAL: Sb. Mosk. in-t stali, 1957, Vol 36, pp 33-58

ABSTRACT: The kinetics of induction heating was investigated on a number of specimens of various steels alloyed with Cr, W, Ni, and Mo melted in a 10-kg induction furnace. The content of Cr, W, and Ni amounted to 1.2, 5.5, and 10 percent, while Mo was introduced in amounts equivalent to 0.2, 0.5, 1, and 2 percent. The C content in each alloy was varied in 0.2 percent steps from 0.2 percent to 1 percent. The heating curves were recorded by means of an oscillograph, while the heating process itself was controlled by a photoelectric pyrometer. The experimental data obtained verify the magnetic theory of the kinetics of induction heating, thus making it possible to explain the cause for the considerable changes in heating rates occurring after the completion of phase and magnetic transformations; this explanation is based on the

Card 1/2 relationship existing between the electromagnetic and temperature

Chair of Metallography & Heat Treatment of Steel.

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137-58-3-5845

Kinetics of Induction Heating of Alloyed Steel

fields in the inductor-heated object system and the field of physical parameters within the specimen being heated. Bibliography: 27 references.

V. R.

Card 2/2

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

KIDIN, I. N.

137-58-3-5846

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 3, p 196 (USSR)

AUTHOR: Kidin, I. N.

TITLE: Conditions for the Formation of Austenite During Induction Heating of Alloyed Steel (Usloviya obrazovaniya austenita pri induktsionnom nagreve legirovannoy stali)

PERIODICAL: Sb. Mosk. in-t stali, 1957, Vol 36, pp 59-64

ABSTRACT: Peculiarities of austenite formation, attributable to variations in the kinetics of the heating process as a function of various alloying elements employed, are examined in the process of induction heating of alloyed steel and are compared with those of carbon steel. When the isothermal stage of austenite formation is considerably higher than the A_1 temperature and when the temperature difference between the Curie point, t_c, and A_1 is comparatively great, then the relative volume in which the first stage (A_1 to t_c) of the transformation takes place will be greater than it would have been, had the isothermal stage of the transformation been close to the temperature of A_1. The role of the second stage, the isothermal one, is also more important in the first instance than it is in the second. The third, post-isothermal

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137-58-3-5846

Conditions for the Formation of Austenite (cont.)

stage plays a more significant role in the second rather than in the first instance. With increasing Cr content it is characteristic for Cr steel to exhibit a slight increase in the inflection temperature and a more pronounced increase in the temperature of A_1. In the case of W and Mo steel the positions of the inflection temperature and the temperature of A_1 remained unchanged at the concentrations investigated (up to 2 percent Mo and 10 percent W). In the case of Ni steel a sharp reduction in the temperature of A_1 is observed together with an even greater decrease of the inflection temperature. The process of transformation in Cr, W, Mo, and Ni steels heated to an identical temperature may develop differently. An examination of the kinetics of induction heating of alloyed steels makes it possible to determine in advance the heating procedure necessary for the attainment of desired results. Compared with Ni steel, the Cr steel must be heated to a higher temperature in order to effect a complete transformation of the initial phases into austenite. The temperature of tempering must be increased with increasing Cr content and decreased with increasing Ni content. The size of austenite grains must diminish with increasing Cr content and increase with decreasing Ni content.

M. Sh.

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Kidin I. N.

137-58-3-5509

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 3, p 146 (USSR)

AUTHOR: Kidin, I. N.

TITLE: High-frequency Induction Tempering of Molybdenum Steel (Vysokochastotnaya zakalka molibdenovoy stali)

PERIODICAL: Sb. Mosk. in-t stali, 1957, Vol 36, pp 65-74

ABSTRACT: A report on the results of a study concerned with the effect of the conditions of high-frequency induction tempering on the size of austenite grains (AG) and on the hardness of steel alloyed with 0.2 percent to 2.0 percent of Mo and containing from 0.2 to 1.0 percent of C. A range of tempering temperatures between 880° and 1040° was investigated; it is established that even at such temperatures as 1040° the AG's are smaller in induction tempering than they are at 800°-900° in a standard tempering process, and that the size of AG's diminishes with increasing rates of heating. The greater hardness produced by means of induction tempering in the steels investigated diminishes with increasing Mo content, a fact which is apparently attributable to an increased content of residual austenite. Thus the reduction in the size of AG, achieved by means of alloying the steel with

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High-frequency Induction Tempering of Molybdenum Steel

Mo, may be intensified by employing high-speed induction heating; this is particularly important in the treatment of products that require improved special properties, such as resistance to breaking, etc.

S. P.

Card 2/2

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

KIDIN, I. N.

VLADISLAVEV, V.S.

25(1) PHASE I BOOK EXPLOITATION SOV/1439

Spravochnik metallista v pyati tomakh, t. 3, kn. 1 (Metals Engineering Handbook in Five Volumes, Vol. 3, bk. 1) Moscow, Mashgiz, 1958. 560 p. 50,000 copies printed.

Ed. (Title page): V.S. Vladislavlev, Professor (Deceased); Ed. (Inside book): V.I. Krylov, Engineer; Tech. Ed.: T.F. Sokolova; Editorial Board: N.S. Acherkan (Chairman and Chief Ed.), Doctor of Technical Sciences, Professor, V.S. Vladislavlev, Professor (Deceased), A.N. Malov, Candidate of Technical Sciences, S.N. Poznyakov, A.Ya. Rostovykh, G.B. Stolbin, and S.A. Chernavskiy; Managing Ed. for Reference Literature: V.I. Krylov, Engineer.

PURPOSE: The book is a reference book for technicians and engineers working in the field of machinery design and in production.

COVERAGE: The book covers the following: engineering specifications, treatment and use of cast iron, steel and carbides, heat treatment of steel and cast iron, specifications, treatment and use of nonferrous metals and nonmetallic materials. I.S. Yanngorskiy, V.P. Vologdin, N.V. Geveling are mentioned as being concerned in this field.

Card 1/24

Surface Quench Hardening of Steel (I.N. Kidin, Professor, Doctor of Technical Sciences)	
Methods of surface quench hardening	307
Surface quench hardening by flame heating	307
Electrolytic quench hardening	313

Card 7/24

Quench hardening with electric resistance heating	316
High-frequency quench hardening	319
Kinetics of induction heating of steel	319
Special features of phase changes in induction heating of steel	319
Process parameters of induction heating in quench hardening	324
Preferred and prohibited regimes of induction heating in quench hardening	325
Tempering after high-frequency quench hardening	327

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ARISTOV, N.P., kand. tekhn. nauk,; BLAGOSKLONSKIY, T.I., kand. khim. nauk,; VESELOVSKIY, V.S., prof., doktor tekhn.nauk,; VLADISLAVLEV, V.S., prof., [deceased]; GOSTENINA, V.M., inzh.; GRINBERG, B.G., kand. tekhn. nauk,; KATTS, N.V., kand. tekhn. nauk,; KESTNER, O.Ye., kand. tekhn. nauk,; KIDIN, I.N., prof., doktor tekhn. nauk,; KIRSHENSHTEYN, Ye.L., inzh.; KITAYGORODSKIY, I.I., prof., doktor tekhn. nauk,; KOLOBNEV, I.F., kand. tekhn. nauk,; KRYLOV, V.V., kand. tekhn.nauk,; LAKHTIN, Yu.M., prof., doktor tekhn. nauk,; LEVI, L.I., kand. tekhn. nauk,; LEPETOV, V.A., kand. tekhn. nauk,; LUNEV, A.A., kand.tekhn. nauk,; LUNEV, F.A., kand. tekhn. nauk, [deceased]; LOTSMANOV, S.N., kand. tekhn. nauk,; MAURAKH, M.A., kand. tekhn. nauk,; MINKEVICH, A.N., kand. tekhn. nauk,; OCHKIN, A.V., inzh.; POPOV, V.A., kand. tekhn. nauk,; RAKOVSKIY, V.S., kand. tekhn. nauk,; SHESTOPAL, V.M., kand. tekhn. nauk,; ACHERKAN, N.S., prof., doktor tekhn. nauk, glavnyy red.; MALOV, A.N., red.; POZDNYAKOV, S.N., red.; ROSTOVYKH, A.Ya., red.; STOLBIN, G.B., red.; CHERNAVSKIY, S.A., red.; KRYLOV, V.I., inzh., red.; KARGANOV, V.G., inzh., red. graficheskikh rabot,; SOKOLOVA, T.F., tekhn. red.

[Metal worker's handbook in five volumes] Spravochnik metallista v piati tomakh. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry. Vol. 3. Book 1. 1958. 560 p. (MIRA 11:11)
(Metals--Handbooks, manuals, etc.)

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SOV/137-58-9-19955

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 9, p 267 (USSR)

AUTHOR: Kidin, I.N.

TITLE: ~~The Effects~~ of Induction-heating Parameters Upon Austenite Grain Size in Chromium Steel (Vliyaniye parametrov induktsionnogo nagreva na velichinu zeren austenita khromistoy stali)

PERIODICAL: Metallovedeniye i term. obrabotka. Moscow, Metallurgizdat, 1958, pp 50-64

ABSTRACT: An investigation is made of austenite grain growth in Cr steels containing 0.4, 0.6, 0.8, and 1.0% C and 1, 2.5, and 5% Cr relative to rate of induction heating (10, 50, 100, and 200 degrees/sec) and the temperature to which heating is carried (800, 880, 960, and 1040°C). It is established that the most important factors affecting austenite grain growth are the temperature and rate of heating in the region of austenite formation. Increase in heating rate at identical temperatures reduces grain size, and increase in temperature at identical velocities increases it. An increase in Cr contents to 2.5% (in steels with 1.0 and 0.8% C) reduces grain growth when heating rate is slow

Card 1/2

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SOV/137-58-9-19955

The Effects of Induction-heating Parameters (cont.)

(50 degrees/sec). The austenite grain in steel hardened with induction heating is always smaller than the grain of steel hardened in the usual way. The greatest changes in grain size are observed in steels containing 1% Cr.

F.U.

1. Induction heating--Metallurgical effects 2. Grains (Metallurgy)--Growth 3. Austenite--Temperature factors 4. Chromium steel--Phase studies

Card 2/2

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

SOV/123-59-23-96998

Translation from: Referativnyy zhurnal. Mashinostroyeniye, 1959, Nr 23, p 115 (USSR)

AUTHOR: Kidin, I.N.

TITLE: The Prospects of Development of Theoretical and Technological Investigations in the Field of Induction Heat-Treatment

PERIODICAL: Tr. Sektsii metalloved. i term. obrabotki metallov. Tsentr. pravl. Nauchno-tekhn. o-va mashinostroit. prom-sti, 1958, Nr 1, pp 3 - 28

ABSTRACT: The author analyzes the contemporary achievements in the field of induction heat-treatment and the trends in which further theoretical and technological investigations should be carried out. To the theoretical problems which are subject to investigation pertain the kinetic characteristics of induction heating. The rate of heating in the range of phase transformations and the heating temperature should serve as the basic parameters in developing the technology of induction heat-treatment. Based on these parameters, it is possible to plot the diagrams of operation conditions which ensure better qualities in comparison with standard heat-treatment. For a correct application of the conditions of induction heat-treatment every shop or high-frequency current section should possess an oscillograph for the recording

Card 1/2

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AUTHORS: Kidin, I.N., Astaf'yeva, Ye. V.

SOV/163-58-1-49/53

TITLE: Radiographic Investigation on the Steel Structure After High Frequency Hardening (Issledovaniye struktury stali posle vysokochastotnoy zakalki metodom radiografii)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958, Nr 1, pp 260 - 265 (USSR)

ABSTRACT: The qualitative and quantitative phase distribution of carbon in the induction expansion of non-eutectoid steels was demonstrated by means of the radiographic method. In all steel samples investigated the heating rate promoted the formation of irregularities in the structures. On the addition of 0,5 % chromium to the steel sample a change in the distribution of carbon as compared to steel sample No. 20 does not occur. With an increase in the chromium content up to 2 % a considerable hampering of the diffusion of carbon in steel occurs. A noticeable retardation of the diffusion process occurs in steel samples with 0,5 % tungsten. On the increase of the tungsten content in the steel samples a hampering of the displacement of the diffusion of the carbon atoms from the primary perlite zone occurs.

Card 1/2

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At $V_{\parallel} = 230^{\circ}$/sec for the production of carbon concentrations of 0,05 % in the medium ferrite ranges of steel with a content of 2 % tungsten a heating to 1300° C is necessary.
Molybdenum occurs in the steel samples almost entirely as solid solution and already small additions of molybdenum considerably influence the diffusion of carbon.
In comparing the results with tungsten steels it became evident that in the case of equal amounts of elements to be alloyed and an equal concentration of carbon in the medium ferrite zone the diffusion in molybdenum steels occurs at much higher temperatures than in tungsten steels
With 1 % molybdenum the steel still has the structure of free ferrite, even when tempered at 1200° C and at $V_{\parallel} = 230^{\circ}$/sec.
There are 4 figures, 1 table, and 6 references, 5 of which are Soviet.

Card 2/2

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

SUBMITTED: October 1, 1957

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

AUTHORS: Kidin, I. N., Bashnin, Yu. A. SOV/163-58-2-41/46

TITLE: The Kinetics of the Isothermal Transformation of Austenite After Induction Heating (Kinetika izotermicheskogo prevrashcheniya austenita posleinduktsionnogo nagreva)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958, Nr 2, pp. 227-233 (USSR)

ABSTRACT: In the induction heating phase transformations occur and it therefore is of importance to investigate the kinetics and the mechanism of the isothermal transformation of austenite. Alloyed steel samples of different composition were used as initial materials with the influence of the alloyed component in the austenite transformation having been taken into account. Comparative isothermal investigations of the austenite transformation were carried out with carbon containing steels in the case of induction and furnace heating. The austenite forming in induction heating is less stable than that obtained in furnace heating. The decomposition of austenite takes place six times more rapid in the case of induction heating at a temperature of 500°C than is the case with austenite obtained by furnace

Card 1/3

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The Kinetics and the Isothermal Transformation of Austenite After Induction Heating

heating. The decomposition of austenite obtained by induction heating within the perlite range represents a pure diffusion process. In induction heating austenite occurs in fine grains, which fact accelerates the destruction process. Besides, the austenite obtained in induction heating is irregular and does not havean uniform chemical composition. The most stable austenite is obtained from eutectic steels. When the carbon content in non-eutectic steels is decreased and the carbon content in hypereutectic steels is increased the rate of austenite decomposition increases. Nickel increases the stability of austenite. When the nickel content is increased and the carbon content remains constant the stability of austenite increases. In the case of a constant nickel content and an increased carbon content the stability of austenite decreases. The decisive factors determining the rate of the decomposition of austenite are first of all the rate of heating within the range of phase transformation, and the temperature of heating.
There are 5 figures, 1 table, and 12 references, 12 of which are Soviet.

Card 2/3

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The Kinetics and the Isothermal Transformation of Austenite After Induction Heating

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

SUBMITTED: December 6, 1957

Card 3/3

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SOV/163-58-3-30/49

AUTHOR: Kidin, I. N.

TITLE: The Possibility of the Reversibility of the Martensite Transformation in Steel (Vozmozhnost' obnaruzheniya obratimosti martensitnykh prevrashcheniy v stali)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958, Nr 3, pp 181 - 188 (USSR)

ABSTRACT: A method of directly measuring the reversibility of martensite transformations in steel was devised. The transition of the surface layer from the ferromagnetic to the paramagnetic state was made use of. In manganese steels with a carbon content of 0,4% and a manganese content of up to 1% a reversible martensite transformation takes place at a rate of heating of up to 10000° C/sec. In the case of a higher manganese content the reversible martensite transformation takes place on the same conditions and at a lower carbon content. The influence of the carbon and manganese content on the temperature of the reversible martensite transformation was investigated. The results are given in figure 4. Manganese

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steels with 0,22% carbon and 2,4% manganese show no dependence of the temperature of reversible martensite transformation on the rate of heating. At a rate of heating of 2500° C/sec.- 15000° C/sec. the reversible martensite transformation takes place within the temperature range of 660-670° C. With the same carbon content and the same alloyed elements the reversible martensite transformation in chromite steels is higher than with manganese steels. In chromite steels with a chromium content of 5-6% the transformation temperature is by 150-160° C higher. There are 5 figures, 1 table, and 10 references, all of which are Soviet.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

SUBMITTED: May 8, 1958

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

18(7)·
AUTHOR: ~~Kidin, I. N.~~ SOV/163-58-4-39/47

TITLE: Influence of the Rate of Heating on the Fine Structure of Nickel Iron (Vliyaniye skorosti nagreva na tonkuyu strukturu nikelevogo zheleza)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958, Nr 4, pp 225-228 (USSR)

ABSTRACT: The influence of the rate of heating on the fine structure of nickel iron was investigated. Engineer R. M. Paretskaya (a woman) took part in the experiments. The alloy was prepared from technically pure iron and metallic nickel in a 10-kg induction furnace. The chemical composition of the alloy was: 0.05% C, 0.39% Mn, 0.08% Si, 7.50% Ni, 0.034% S, 0.017% P.
The analysis of the data obtained shows the following: the rate of heating has a certain influence on the magnitude of the coherent ranges of nickel iron. An increase in the quenching temperature causes an increase in mosaic blocks, but the degree of reduction of this magnitude is virtually independent of the heating temperature for quenching, at an increase in the rate of heating up to 50 and 1500°/sec in nickel iron. An essential increase in the tensions of second type is only observed at a

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very high increase in the rate of heating - up to 1500°/sec. An increase in hardness at an acceleration of heating corresponds to the character of the change of magnitude for coherent ranges.- In nickel iron, the rate of heating has an influence on the elements of fine structure and the hardness in the same direction as in chrome iron. In addition, the hypothesis on the formation of austenite nuclei on the boundaries of the mosaic blocks of the initial ferrite at a high rate of heating was again proved in the present investigation. The results of the investigation also confirm the possibility of obtaining finer mosaic blocks. There are 1 figure, 1 table, and 6 Soviet references.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

SUBMITTED: May 29, 1958

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510017-6

129-58-7-2/17

AUTHORS: ~~Kidin, I. N.,~~ Doctor of Technical Sciences, Professor and Bashnin, Yu. A., Engineer

TITLE: Kinetics of Isothermal Transformation of the Austenite of Carbon Steel During Induction Heating (Kinetika izotermicheskogo prevrashcheniya austenita uglerodistoy stali pri induktsionnom nagreve)

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, Nr 7 pp 10-15 (USSR)

ABSTRACT: In earlier work the authors of this paper (Refs.3 and 4) and other authors (Refs.5 and 6) have shown that austenite forming during induction heating is characterised by a non-uniform chemical composition, the degree of which depends on the heating regime and on the nature of the heated steel. In this work the authors investigate the kinetics and the mechanism of isothermal decomposition of the austenite as a function of the composition of the steel and the austenisation regime. The chemical compositions of the selected steels are entered in Table 1, p.11. The kinetics of the isothermal decomposition were studied by the magnetometric method. For comparison and for better elucidation of the specific features of decomposition of the austenite obtained as a result of

Card 1/3

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129-58-7-2/17

Kinetics of Isothermal Transformation of the Austenite of Carbon Steel During Induction Heating

induction heating the austenite decomposition was also studied after ordinary heating in the furnace with heating regimes as enumerated in Table 2, p.11. Isothermal transformation diagrams as well as the obtained kinetic curves of austenite decomposition are given. On the basis of the obtained results the following conclusions are arrived at:

1) For the investigated grades of steel the austenite has a lower stability in the case of induction heating than in the case of ordinary heating due to the larger non-uniformity of the carbon distribution and the fact that the austenite grains are finer;

2) The kinetics of decomposition of the austenite which forms during induction heating is similar to the kinetics pertaining to ordinary heating for the pearlitic temperature range. There is no justification for assuming that the mechanism differs from that of decomposition of austenite obtained in the case of slow heating;

Card 2/3 3) Transformation of the austenite obtained during

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129-58-7-2/17

Kinetics of Isothermal Transformation of the Austenite of Carbon Steel During Induction Heating

induction heating in the intermediate range begins according to the martensitic kinetics with subsequent superposition of the diffusion process of carbon redistribution in the austenite. This conclusion can be made by considering the transformation after induction heating as being of a two-stage nature;
4) A decisive factor determining the characteristic of decomposition of austenite obtained during induction heating is the regime of austenisation: the speed of heating and the range of phase transformations and the heating temperature, i.e. the magnitudes determining the uniformity of the composition of the austenite and its grain size.
There are 3 figures, 2 tables and 9 references, 8 of which are Soviet, 1 English.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

Card 3/3

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SOV/129-58-9-1/16

AUTHORS: Kidin, I. N., Doctor of Technical Science, Professor; Astaf'yeva, Ye. V. and Marshalkin, A. N., Engineers

TITLE: Features of the Process of Tempering After High Frequency Hardening (Osobennosti protsessa otpuska posle vysokochastotnoy zakalki)

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, Nr 9, pp 2-12 + 1 plate (USSR)

ABSTRACT: "Self tempering", the duration of which is a few seconds, is in many cases convenient and economical (Refs 1 and 2). However, this type of heat treatment has not been used adequately due to non-availability of the necessary automatic control and metering apparatus. Of great interest are the results relating to combination of electric tempering with electric hardening (Refs 3-5). An important condition of electric tempering is that uniform heating should be achieved, to the desired depth, without overheating of the surface. In earlier work of the authors (Refs 6-10) it was found that if the speed of heating for hardening is high, the state of the austenite is characterised by a considerable non-uniformity in the carbon content as compared to

Card 1/8

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austenite formed during ordinary slow heating. As a result of this non-uniformity, the austenite to martensite transformation during the cooling will take place within a wider temperature range; the micro-volumes of the austenite which are most saturated with carbon become transformed into martensite at lower temperatures and later than the micro-volumes which are poor in carbon and for which the martensitic point is located at a more elevated temperature. The micro-volumes of the martensite forming at a higher temperature may decompose during the further cooling of the hardening process forming martensite of a lower tetragonality and a finely dispersed carbide phase. A similar phenomenon for tempering after ordinary hardening was investigated in detail by Kurdyumov, G. V. and Oslon, N. (Ref 10) by X-ray methods. In this paper the authors investigate the changes in the structural state and the mechanical properties of a number of engineering and carbon tool steels during ordinary tempering in conjunction with regimes of high frequency hardening and the features of the obtained structure. In the case of rapid induction heating

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of steel prior to hardening, a concentration non-uniformity can be created in the micro-volumes. Study of this non-uniformity by radiography methods has enabled establishing the fact that the distribution of the carbon at the end of the induction heating may differ, depending on the heating regime and the character of the initial structure. Micro-structures and micro-radiograms of Steel 20 hardened from 1100°C with various heating speed are reproduced in Fig.1 (plate). The structure is relatively uniform in the case of slow heating, whilst with increasing heating speeds the non-uniformity in the carbon distribution becomes much more pronounced. This was also confirmed by X-ray studies. The features of decomposition during tempering of the non-uniform martensite were also studied; the graph Fig.3 indicates the curves of the changes of the (110) lines after tempering of specimens of the Steel U7 and, by comparing the appropriate curves, it can be seen that an increase in the heating speed for heating to the same temperature, e.g. 960°C, results in an increase in the width of the line and consequently also in an increase in the non-uniformity. In Fig.4 the changes are graphed

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SOV/129-58-9-1/16

Features of the Process of Tempering After High Frequency Hardening

of the maximum carbon concentration during tempering of Steel 40 which prior to hardening was heated with a speed of 130°C/sec from 920 and 960°C respectively. The influence of low temperature tempering on the mechanical properties after high frequency hardening was investigated by the continuous-successive method on the Steels 40 and 35 Kh; for the impact tests, specimens of 11 [illegible] were chosen in accordance with the suggestion of I. V. Kudryavtsev (Ref 13). 100 mm long specimens were hardened using as a current source a tube oscillator, the heating speeds in the regions of phase transformations were 50, 100, 200 and 400°C/sec for the temperatures 900, 1000 and 1100°C. The tempering was effected at 120, 150, 180 and 200°C for heating durations of 15, 30 and 60 minutes. From the tempered specimens the centre part of a length of 55 mm was cut out by the anodo-mechanical method and in this a 0.5 mm notch with a recess angle of 60° was made. Specimens which have been hardened right through have been tested on an impact machine using an impact of 10 kgm. The influence of the high

Card 4/8 frequency hardening on the impact strength after tempering

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SOV/129-58-9-1/16

Features of the Process of Tempering After High Frequency Hardening

is quite considerable as can be seen from the graphs, Fig.5; in the case of Steel 40 a heating speed of 50°C/sec will ensure an impact strength equal to the impact strength obtained after ordinary hardening and tempering only if the tempering is effected at 900°C. Increase of the hardening temperature to 1000 and 1100°C leads to a considerable decrease of the impact strength. However, an increase in the heating speed prior to hardening to 200°C, and particularly to 400°C, followed by tempering will ensure a considerable improvement of the combination of the toughness and hardness. The highest impact strength was obtained in the case of tempering at 200°C for one hour after hardening from a temperature of 1000°C using a heating speed of 400°C/sec. By using this regime an impact strength is obtained which is almost double that obtained after ordinary hardening followed by equal tempering. In Fig.6 the change of the impact strength after hardening followed by low temperature tempering is graphed for the Steel 40 hardened from 920°C after heating at a rate of 130°C/sec. The breaking strength was measured of standard notched specimens of

Card 5/8

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40KhN steel which were heated prior to hardening with a current of 2.5 kc/sec, a heating speed of 20°C/sec to 970°C and, after hardening, they were tempered for one hour at 120, 150 and 180°C respectively. For comparison the breaking strength was also measured of specimens after ordinary hardening and low temperature tempering. It can be seen from Fig.7 that the breaking strength for induction hardening as well as ordinary hardening increases with increasing temperature of the low temperature tempering. Specimens hardened from 970°C after heating at a rate of 20°C/sec showed an increase in the breaking strength from 8 to 9.8 tons after tempering at 120°C and to 11.3 tons after tempering at 180°C. The changes in the mechanical properties were also investigated for medium and high temperature tempering for the Steels 40KhN and 40 KhG. Hardening from 1000°C followed by tempering ensures for the steel 40KhN the same properties as ordinary hardening followed by tempering. However, hardening from 900°C with the same speed of heating and subsequent tempering produces an optimum combination of the properties, namely, a higher

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SOV/129-58-9-1/16

Features of the Process of Tempering After High Frequency Hardening

impact strength and hardness than after ordinary hardening and tempering. In the case of heating prior to hardening with a speed of 400°C/sec advantages compared to ordinary hardening are observed in the case of hardening from 1000 and 1100°C; the impact strength will be lower in the case of hardening from 1200°C. The heating speed of 100°C/sec is inadvisable since for the chosen temperatures of hardening and subsequent tempering the impact strength will be lower than for ordinary hardening. For tempering temperatures exceeding 350°C the increase in hardness due to high frequency hardening does not remain conserved for the Steels 40KhN and 40KhG. At higher tempering temperatures (up to 600°C) the hardness of high frequency hardened steel may in some cases be lower than of the same steel after conventional hardening which is obviously due to a difference in the kinetics of the processes of coagulation in steel hardened after induction heating. High frequency hardening does not suppress type I and type II temper brittleness. These are observed at the same tempering temperatures as for conventionally hardened steel.

Card 7/8

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SOV/129-58-9-1/16

Features of the Process of Tempering After High Frequency Hardening

However, the impact strength at the temper brittleness temperatures is considerably higher for steels which were high frequency hardened under optimum heating regimes than for steels which were hardened by standard methods of heating. The here given experimental data indicate that there is a relation between the regime of high frequency hardening and the subsequent tempering, i.e. between the character of the distribution of carbon and the alloying elements after hardening and their redistribution after tempering, which has a considerable influence on the changes of the mechanical properties of hardened and tempered steel.
There are 7 figures and 16 references, 15 of which are Soviet, 1 English.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

1. Steel--Heat treatment 2. Tool steel--Heat treatment 3. Steel--Properties 4. Steel--Transformations 5. High frequency heating--Applications

Card 8/8

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BARDIN, I.P., akademik; DYMOV, A.M., prof., doktor khim.nauk; DIKUSHIN, V.I.; akademik; TSELIKOV, A.I.; OTLEV, I.A., inzh. (g. Khimki, Moskovskoy oblasti).; DEM'YANYUK, F.S., prof., doktor tekhn.nauk; RYBKIN, A.P., prof., doktor tekhn.nauk; YAKUSHEV, A.I., prof., dokt. tekhn.nauk; KIDIN, I.N., prof. doktor tekhn.nauk; KOROTKOV, V.P., dots., kand. tekhn.nauk; SHUKHGAL'TER, L.Ya., dots., kand.tekhn.nauk; KUKIN, G.N., prof., doktor tekhn.nauk.

Every specialist should know the principles of of standardization. Standartizatsiia 22 no.4:34-40 Jl-Ag '58. (MIRA 11:10)

1.Chlen-korrespondent AN SSSR (for TSelikov). 2.Predsedatel' tekhniko-ekonomicheskogo soveta Mosoblsovnarkhoza (for Rybkin). 3.Direktor Moskovskogo instituta stali imeni I.V. Stalina (for Kidin). 4.Direktor Moskovskogo vechernego mashinostroitel'nogo instituta (for Korotkov).
(Standardization--Study and teaching)

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SOV/137-58-11-22972

Translation from: Referativnyy zhurnal. Metallurgiya, 1958, Nr 11, p 163 (USSR)

AUTHOR: Kidin, I. N.

TITLE: Characteristics of the Passing of Carbon Into Solid Solution Upon Induction Heating of Chromium Steel (Usloviya perekhoda ugleroda v tverdyy rastvor pri induktsionnom nagreve khromistoy stali)

PERIODICAL: Sb. Mosk. in-t stali, 1958, Vol 38, pp 405-419

ABSTRACT: The kinetics of the passing of Carbon (C) into solid solution upon induction heating of specimens of Cr steel containing (in%): C 0.6 0.8, and 1.0 and Cr 1.0, 2.5, 5.0, and 10.0, were investigated by the X-ray diffraction method. The heating was carried out at a rate of 40, 75, 130, and 200°C/sec to 880, 960, and 1040°C temperatures. It is established that the passing of C into solid solution is more complete in steel with 1.0% Cr than in steel with from 5 to 10% Cr; in the latter a major portion of C remains in the carbides. The retardation in the dissolution of carbides occurring upon an increase in Cr content is explained by the fact that steels with 1.0% Cr contain carbides of the cementite type, whereas the major portion of carbides in steels with 5% Cr and all the carbides in steels with 10% Cr

Card 1/2

Kafedra metallovedeniya i termicheskoy obrabotki

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Characteristics of the Passing of Carbon Into Solid Solution (cont.)

[illegible] of a more stable trigonal carbide.

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Card 2/2

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KIDIN, I. N.

18(0) PHASE I BOOK EXPLOITATION SOV/2316

Akademiya nauk SSSR. Institut nauchnoy i tekhnicheskoy informatsii

Metallurgiya SSSR, 1917-1957; [t.] II (Metallurgy in the USSR, 1917 - 1957; Vol 2) Moscow, Metallurgizdat, 1959. 813 p. Errata slip inserted. 3,000 copies printed.

Ed. (Title page): I. P. Bardin, Academician; Ed. (Inside book): G. V. Popova; Tech. Ed.: P. G. Islent'yeva.

PURPOSE: This book is intended for metallurgists.

COVERAGE: The articles in this collection present historical data on the achievements of Soviet metallurgy, both ferrous and nonferrous, during the period 1917-1957. Advances in theory and practical application are thoroughly discussed. Many of the articles describe the present status of individual branches of metallurgy and give an idea of what may be expected in the future. Advances made in other countries are also discussed. The articles are accompanied by a large number of references. For further coverage, see Table of Contents.

Card 1/15

Rykalin, N. N., Corresponding Member, USSR Academy of Sciences; N. O. Okerblom, Professor, Doctor of Technical Sciences; A. A. Yerokhin, Candidate of Technical Sciences; and V. Kh. Shorshorov, Candidate of Technical Sciences. (Institute of Metallurgy imeni A. A. Baykov, USSR Academy of Sciences; and Leningrad Polytechnic Institute) Progress in the Science of Welding Metals in the USSR 194

The authors discuss the studies that have been made in the USSR of the theoretical aspects of welding, beginning in the latter part of the nineteenth century. Specific topics are: investigation of the arc,

Card 5/15

theory of welding deformations and stresses, calculation methods used in planning the industrial production of welded structures, and the theory of strength of welded structures.

Kidin, I. N., Professor, Doctor of Technical Sciences. (Moscow Institute of Steel) Use of High Frequency Currents in Physical Metallurgy 216

The author discusses the following: types of phase transformations occurring during rapid heating; the magnetic theory of the kinetics of induction heating; interconnection between original structure, steel composition, and the kinetics of heating; structure of austenite formed during induction heating; transformation of austenite into martensite and tempering after high-frequency hardening; ways of improving the technology of induction heat treatment; regimes of induction hardening; and application of induction heating in carburizing.

Gulyayev, A. P., Professor, Doctor of Technical Sciences. (Moscow Evening Institute of Machine Design) Heat Treatment and Thermochemical Treatment of Steel 239

After giving a classification of the types of heat-treating processes, the

Card 6/15

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